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COMPLETE SPECIFICATION

Improvements in and relating to Automatic Machines for Assembling in the Form of Panels, Laths and similar Elements and the Panels resulting therefrom

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The present invention relates to manufacturing panels formed of the juxtaposition of rows of laths, strips, planks or other squared elements which have a constant rectangular or square cross-section and are composed of wood or other non-friable material for producing panels which may be used as such combined, or used in the formation of ply wood.

Machines have already been proposed for the mass-production of such panels which comprise a receiving and discharging passageway formed of two walls providing between them a space equal to the thickness of the squared elements, i.e., the thickness of the panel to be obtained, and thrust means for moving through this passageway the squared elements that a feed device introduces in this passageway row by row. These elements receive glue on one of their lateral and longitudinally extending edges and the various rows of elements are thus glued together.

In a first type of known machine the feed device and the thrust means are combined into one mechanism, the laths or other elements placed on this mechanism being first presented by the latter in front of the passageway and then pushed against the part of the panel previously formed in this passageway.

There is also known a second type of machine having a lateral feed in which a feed device placed at the side and at the input end of the passageway feeds the successive rows one by one by displacing the elements of each row in a direction perpendicular to the longitudinal axis of the machine along which the work is moved in the passageway in the course of its formation.

The machines of these types are usually so arranged as to permit the production of a continuous sheet of roughly assembled elements, the width of this sheet corresponding to the maximum capacity of the passageway, that is its width. The panels are supplied by the machine in the required lengths by means of a panel sectioning device whose operation necessitates, if serious mechanical complications are to be avoided, interruption in the feeding of the machine and the action of the thrust device.

The invention has for object to remedy this serious disadvantage and provides an improved machine which permits the obtainment in a direct manner at the output end of the passageway panels having finished dimensions that are controllable both in the direction of the rows of elements and in the direction perpendicular to these rows. This machine is simple in construction, automatic in operation and requires very little attention in operation. Panels of very high quality are produced at a high rate and at very low power consumption. There is great economy of wood or other material from which the laths or elements are made, for the machine may be fed with elements of any length. Hence waste and rejects are practically eliminated.

This improved machine is of the aforementioned second type which comprises in combination: a receiving and discharging passageway; a lateral feed device for

introducing one by one at the input end of this passageway successive rows of squared elements, these rows of elements being disposed transversely of the direction of feed of the panel, and this device including means for continuously applying glue to these elements thrust means for moving or feeding each row introduced together with the work composed of these rows in a longitudinal direction with respect to the passageway; and driving means including a clutch.

This machine is characterised in that it comprises, in combination with the aforementioned devices: a first regulating device for determining the length of the rows; control means for said clutch associated with this first regulating device for engaging the driving means for the thrust means when one row has been obtained without any space between the squared elements disposed end to end, this row being if need be formed of a single squared element: a second regulating device and shifting means provided on the feed device and controlled by the second regulating device for separating the first row of each panel to be produced from the gluing means.

By the aforementioned combination it is possible to obtain panels whose dimension in the longitudinal direction with respect to the rows may vary as required between the maximum width of the passageway and a dimension of the order of one or several decimetres. Further, in the direction perpendicular to the rows, that is in the longitudinal direction of the passageway, the length of the panels may be anything ranging from the width of one row to that of any number of rows.

The invention has for further object to provide the panel produced by the aforementioned machine, this panel being formed of a number of juxtaposed rows of squared elements, each row including one or several elements disposed end to end. These elements are fed to the machine in any haphazard manner and the various rows are glued together along the entire length of their lateral edges. The forward or outer edge of the first row of the panel to issue from the machine includes along a short length from one of its ends, a portion of glue which serve to connect this panel to the preceding one when it leaves the machine. The machine is in fact arranged in such manner that the work issuing therefrom is formed of a succession of panels connected together along a very short length of their adjoining edges.

Other features and advantages of the invention will be apparent from the ensuing description in which the elements of the panels are described as laths. It should be understood that these laths may of course be replaced by any other squared elements having a constant cross-section.

In the accompanying drawings, given merely by way of example:—

Fig. 1 is a longitudinal sectional view perpendicular to the rows of laths of a portion of the work issuing from the machine according to the invention.

Fig. 2 is a corresponding plan view with a portion cut away.

Fig. 3 is a longitudinal vertical sectional view of the machine on line 3—3 of Fig. 4.

Fig. 4 is a plan view thereof.

Fig. 5 is a perspective view of the portion of the machine on the input side of the latter, i.e., the portion including the various mechanisms, the lateral feed device and the thrust means.

Fig. 6 is an elevational view of one of the eccentrics controlling the thrust means and of a cam controlling the displacement of the saw located at the output end of the feed device.

Fig. 7 is a corresponding plan view.

Fig. 8 is a plan view partially in section of the housing of the adjustable abutment device adapted to determine the length of the rows of laths and of the conjugate switch for controlling the electromagnetic clutch of the driving means of the machine.

Fig. 9 is a diagrammatic sectional view of one mode of carrying out the clutch.

Fig. 10 is a plan view of the feed device on a scale larger than that of Fig. 4, and

Fig. 11 is an elevational view of the second regulating device by means of which it is possible to control the number of rows of laths in each panel.

I.—Description of the Work or Panel Obtained

Reference will be had firstly to Figs. 1 and 2, which show in longitudinal section and in plan a portion of the work obtained from the machine. This work is formed of a succession of panels P^1, P^2 . . . . P_p each one of which comprises a number of rows of laths (1—10 for the panel P^1, and 1_p—10_p for the panel P_p). Each of these rows includes one or several laths the number per row depending on the length of each successive lath fed to the machine. Thus, as seen in Fig. 2, the row *np* is composed of two laths, similar to the preceding row. The third row from the right end of the panel P_p has only one lath and the following row has two. These laths are disposed end to end. They may be of wood or any other natural or synthetic material (for example, reconstituted

wood). The cross section of all the laths or elements is constant. This may be either square or rectangular, but the dimension a in the direction perpendicular to the panels is preferably smaller then the dimension b in the direction parallel to the sides of the panels.

As will be understood hereinunder, it is possible to obtain from the machine panels which are identical in thickness a. The dimension l^1 along the rows and the dimension l^2 perpendicular to the latter may vary from one panel to the other. The dimension l^1 may vary between a maximum corresponding to the width of the passageway of the machine and a minimum of one or two decimetres. The dimension l^2 may vary between the width b of a single row and the width of any number of combined rows of width b. In each panel the rows are connected together along their adjoining edges by glue 11 that may be of any type but preferably thermo-setting.

At the ouput end of the machine the panels hold together of account of a temporary gluing 14 which is applied along a very short length of their adjoining edges 12 and 13 adjacent one of the lateral edges of the panels. The length of gluing 14 is short enough to allow the panels to be easily separated. Each panel includes, then, along its edge 12 traces of glue 14 by means of which it is possible to identify that this panel has been obtained from the machine according to the invention.

II.—Description of the Machine.

The direction from the input side of the machine to the output side thereof represents the direction in which the rows of laths move inside the machine passageway. This direction is from the right to the left in Figs. 3, 4 and 5.

The machine comprises five parts:—

a) A stand A.

b) A receiving and discharging passageway B, through which the rows of laths and a part of the work formed of these rows glued together pass before they attain the output end of the machine.

c) Abutment and thrust means C, which are disposed at the input end of the passageway B and exert a short sharp thrust on each introduced row after having regulated the length of the latter. The passageway B is adapted to distribute and maintain this thrust over all the rows contained therein in order to ensure that these rows are correctly glued together.

d) Driving means D for driving the thrust means C.

e) A lateral feed device E whereby the successive rows of laths are introduced in a transverse feed chamber provided between the passageway B and the abutment and thrust means C. This device E is partly under the control of the driving means D.

Each of these parts will now be described.

a. Stand A.—It comprises a lower frame including longitudinally extending side-members 16 which are connected by transverse members 17 and pairs of uprights 18, 19 and 20 (Fig. 5). The uprights 18 and 19 are connected by two upper longitudinally extending bars 21 connected together at the input end of the machine by a transverse member 22. Beams or bolsters are disposed between the other pairs of uprights; these beams will be described hereinafter with the various devices with which they are combined.

b. Passageway B.—It is symmetrically disposed relative to the longitudinal vertical plane XX (Fig. 4) of the machine and comprises two horizontal walls or plates so aranged as to provide between their opposing faces a space 23 through which the work or panel in the course of production is displaced in the direction of arrow f^1 (Fig. 3).

The lower plate is for example formed of the webs 24a of **U**-section channels 24 which are upturned and disposed longitudinally of the machine. These channels are supported on a transverse beam or bolster 25 secured to the uprights 20. At the input side of the passageway the channels 24 rest on another transverse beam 26 the height of which is adjustable by means of the screws 27 of jacks 28. Thus the position of the lower plate of the passageway 23 may be adjusted as desired by pivoting it about the support 25.

It will be observed that the portion of the passageway adjacent the output end thereof may be heated by means of heating boxes or chambers 29, which are combined with the channels 24 by members 30 connected to the latter. Steam or other heating fluid enters through the pipe 31 and is conducted through pipes 32 into the chamber 29. Further pipes 33 connect the latter to a collector 34 for the exhaust of the cooled fluid.

The upper wall of the passageway B is formed of two parts which are disposed adjacent the input and output sides respectively of the machine. The part adjacent the input side comprises plates 35 secured to longitudinally extending members 36 which are downwardly urged by springs 37 housed between these members 36 and the upper web of a fixed beam 38 connected to the uprights 19. The members 36 carry, slidably mounted in their lower webs, retaining presser plates 40. Springs 41 apply high pressure on the

latter and urge them into the passage 23. The lower faces 42 of these presser plates are beveled on the input side of their surface. These plates are disposed at sufficient distance from the ends 39 of the members 36 to provide, between these plates and these ends above the lower plate of the passageway, a transverse space 43 which forms a feed chamber whose width in the longitudinal direction of the machine is greater than the width *b* of one row of laths (see Fig. 1). Each plate 35 includes, furthermore, at the rear of the presser plates 40, a slope or bevel 35*a* which aids the introduction of the laths in the passageway B.

Following on the plate 35, the ouput side of the top of the passageway B comprises webs 44*a* of further U-section channels 44 whose ends are supported and connected by links 45 attached to the members 36. The flanges of the other ends of these channels 44 are connected by a small transverse member 46. The position of each transverse member 46 is adjustable with respect to a beam 47 by means of a bolt 48 and nut 48*a*, the connection of the transverse member 46 and the bolts 48 being so arranged that each transverse member and the corresponding channel 44 is capable of pivoting about an axis extending transversely of the machine. A spring 50 is interposed between each transverse member 46 and the beam 47 so that this transverse member and the corresponding channel 44 is raisable in opposition to this spring.

Owing to this arrangement the work can leave or enter the passageway only by slightly separating the two walls or plates of which it is formed and thus compressing the springs 37 and 50. Hence there is created a certain resistance to the displacement of the work and the pressure applied intermittently by the thrust means C is transmitted to and maintained over all the rows of laths in this passageway.

Strips 51 are connected to the channels 44 and form with the latter heating boxes or chambers which resemble square or rectangular-sectioned tubes. The latter receive steam or any any other hot fluid from a collector 52 through pipes 53. The cooled fluid is discharged through pipes 54 and a collector 55.

c. Thrust means C.—It will be recalled that, after a row of laths has been introduced in the feed chamber 43 at the input side of the passageway B, the thrust means urge this row of laths under the presser plate 40 and in doing so urge the preceding rows of laths under the retaining plates 35.

The thrust means includes a main transverse member 56 which is capable of moving backwards and forwards in a substanitally horizontal direction parallel to the longitudinal axis of the machine. This transverse member is connected to the side members 16 of the stand A by two articulated parallelogram units formed of two pairs of long links 57 which are pivoted at 58 to this transverse member and at 59 to the stand. The left hand side of the transverse member 56, as seen in Fig. 3, is extended by an angle-iron 60 whose horizontal flange extends into the passageway B where its left hand edge 61 defines one side of the feed chamber 43.

On the transverse member 56 two adjustable blocks 62 form a transverse slideway along which a slide 63 is adjustable in position. This slide carries the housing 64 containing the adjustable abutment device, which is adapted to determine the length l^1 (Figs. 2 and 4) of the various rows of laths, and a switch device, which is controlled by this abutment device and is adapted to control the engagement and disengagement of the clutch of the driving means D.

In this housing 64 is disposed (Figs. 4 and 8) a first lever 65 which is pivotal about a vertical axis 66 and is disposed parallel to the longitudinal axis of the machine. This lever 65 is yieldably held in this position by a spring 67. At the end of this lever, which is disposed outside the housing and projects from the latter in the direction of the feed device E (Fig. 4), there is provided a roller 68 which is freely rotative on its spindle 69 and constitutes the principle stop or abutment for regulating the length of the rows of laths.

Behind the lever 65 relative to the direction of feed of the laths is disposed, integral with the housing 64, and auxiliary fixed stop 70 adapted to limit the pivotal movements of the lever 65 in the direction of arrow *f*. The actual length l^1 of the row of laths is that obtained when the lever 65 abuts against the stop 70 (the lever 65 is shown in Fig. 4 to be in its normal position before the row of laths urges it against the stop 70). Adjustment of the position of the housing 64 relative to the axis of the machine must therefore be effected when other row lengths are required.

The lever 65 extends beyond the axis 66 and its end 71 forms a boss which cooperates with another lever 72 which is pivotal about an axis 73 and carries a weight 74 at its end distant from its point of contact with the lever 65. This lever 72 is held in its inoperative or idle position shown in Fig. 8 by a return spring 75. It is adapted to cooperate with the pivotal member 76 of a switch I^1. The latter includes a fixed stud 77 and is ordinarily

held open by a spring 78 which urges the member 76 against a fixed stop 79. The member 76 of the switch I^1 intersects the path of movement of the lever 72 in such manner and the weight 74 of this lever is such that, if the lever 65 is displaced even to the full extent of its travel by a low-powered thrust (due to the impact of a lath pushed into the feed chamber 43), this displacement, on account of the inertia of the weight 74 and the action of the return spring 75, fails to urge the lever 73 sufficiently in the direction of arrow f^4 to close the switch I^1.

Furthermore, only the conjugate action of the total impact on the abutment 68 of a row of laths without gaps therebetween and the thrust exerted on this row by the feed device is sufficient to furnish the energy necessary to cause the lever 72 to pivot sufficiently to close the switch I^1, in which case the lever 72 leaves the end 71 of the lever 65 under the action of the kinetic energy of the weight 74.

d. Driving means D.—(Figs. 3, 4, 6 and 7)—It includes a cross shaft 80 rotatably mounted in bearings 81 secured to the rear transverse member 22. This shaft is capable of being rotated through no more than 360° in the direction of arrow f^5 (Figs. 3 and 6) by an electric motor 82 which is carried by the stand A and is connected to a pulley 83 and a belt 84 to a flywheel-pulley 85. This flywheel is freely rotative on the shaft 80 with which it may be engaged by means of a clutch controlled by the switch I^1 of the thrust means C.

The clutch mechanism is of conventional type and is diagrammatically represented in Figs. 3, 4, and 9. Keyed on shaft 80 and disposed adjacent the pulley 85, is a clutch plate 86 provided with a peripheral groove 87 in which extends even in the engaged position of the clutch (Fig. 9), a block or shoe 88 which is integral with a clutch locking pin 89. The latter is U-shaped, is movable in the plate 86 and is urged by a spring 90 in the direction of arrow f^6. In the engaged position of the clutch, the block 88 is caused by this spring to engage partially in a recess 91 whereas the end of the other branch of the U is engaged in a circular recess 92 which is concentric with the axis of the shaft 80 and is provided in the adjacent face of the flywheel 85. An abutment 93 is provided across this recess so that in the engaged position of the clutch the flywheel 85 encounters the end of the pin 89 and thus causes the shaft 80 to rotate.

The clutch is disengaged by shifting back or withdrawing the pin 89 by means of a clutch disengaging lever 94 which slides back the block 88. The lever is integral with a shaft 95 journalled in the housing. A spring 96 tends to cause it to pivot in the direction of arrow f^7 and thus permit engagement of the clutch. It is held in the position of clutch disengagement by a rod 97 which is pivoted thereto at 98 (Fig. 3) and includes a block 99 that co-operates with a locking abutment 100 carried by the machine stand A. The lever 94 can only withdraw from the block 88 and thus permit clutch engagement when the rod 97 is raised in the direction of arrow f^8 (Fig. 3) by the electromagnet 101 whose feed circuit is controlled by the switch I^1.

In order to re-engage the lever 94 with the block 88 at the end of the travel of the thrust means C in the direction of arrow f^1, a crank 102 is provided secured to the shaft 95 of the clutch disengaging lever 94. The end of this crank 102 co-operates with a yieldable stop 103 which is carried by a rod 104 secured to the transverse member 56 of the thrust means C.

This clutch engaging and disengaging mechanism operates in the following manner:—

In the disengaged clutch position (Figs. 3 and 4) the locking pin 89 is withdrawn from the flywheel 85, since its block 88 is in contact with the lever 94 which is locked in position by the rod 97.

When the switch I^1 is closed, the electromagnet 101 is energized, the rod 97 is raised and the spring 9 withdraws the lever 94 from the block 88. The spring 90 returns the locking pin 89 so that it extends once more into the recess 92 and the abutment 93 of the flywheel 85 thereafter drives the pin 89 and causes the shaft 80 to be rotated in the direction of the arrow f^5.

When, at the end of the travel of the thrust means C in the direction of the arrow f^1, the stop 103 encounters the crank 102, the lever 94 resumes its position of clutch disengagement and, towards the end of a complete revolution, withdraws the locking pin 89 from the flywheel 85, and the rod 97 is once more held by the block 99 which engages behind the abutment 100.

The driving means D is connected to the thrust means C by parallel couplings including connecting rods and eccentrics. Eccentric plates 105 are keyed to the shaft 80. On each of these plates is mounted an eccentric strap 106 integral with a connecting rod 107. Each rod 107 carries at its other end a pin 108 which carries two freely rotative rollers 109. The latter are capable of engaging in the downward direction two hooks 110 connected to the side of the transverse member 56 of the thrust means C.

It will be easily undestood that one rota-

tion through 360° of the shaft 80 in the direction of arrow f^5 (Figs. 6 and 7) causes the thrust means C to move firstly in the direction of arrow f^6 and then in the opposite direction. The throw *e* of the eccentrics is so chosen that this movement is sufficient to move the edge 61 of the angle iron 60 of the thrust means C through a distance which is at least equal to the distance *g* between this edge 61 and the adjacent edges of the presser plates 40 of the passageway B.

Each eccentric device is completed by means for braking the strap 106 relative to the plate 105. On either side of the plate are disposed two discs 111 (Fig. 7) which are caused to bear against the plate 105 and against the strap 106 through the medium of friction members 112 by springs 113 housed between these discs 111 and nuts 114 screwed on rods 115 which pass through the assemblage thus formed. Hence, when the shaft 80 is stopped in the position shown in Figs. 3, 6 and 7 (which corresponds to extreme position of the rearward travel of the thrust means C) it is possible, owing to the undirectional coupling between the connecting rods 107 and the thrust means C through the rollers 109 and the hooks 110, to pivot upwardly the rods 107 by means of handles 106^a carried by the straps 106 and thus uncouple these rods from the thrust means C. The latter may now be shifted back in the direction opposite to that of arrow f^4 for cleaning and inspection purposes. The rods 107, which are braked by the friction members 112, maintain their raised position so long as the shaft 80 is not engaged by the clutch. In the course of machine operation, when the shaft 80 rotates in the direction of arrow f^5 and the rods are engaged with the thrust means C, these rods cannot uncouple from the latter, for the friction caused by the friction members 112 tends constantly to rotate the rods in the direction of arrow f^5 and the rollers 109 are held permanently in the hooks 110.

e) Feed and gluing device E.—This device, which is located at the left of the machine when the latter is viewed from the input end, is intended to introduce laths automatically and continuously in the feed chamber 43, which should be filled completely without any free space between the laths over the part thereof situated to the left of the abutment formed by the roller 68. This device comprises a fixed table 116 carrying driving and guiding devices for the lath such as that shown at *lg* in Figs. 2, 4 and 10. This lath *lg* forms part of or constitutes the entire first row of a new panel Q which succeeds the practically completed panel P.

The lath driving device includes in combination: a lower roller 117 which is freely rotative about an axis parallel to the longitudinal median plane XX of the machine in the opening 118 of the table 116 (Fig. 5), and an upper driving roller 119 which is fluted, grooved or knurled. This roller is keyed to the end of a shaft 120 which is continuously rotated by an electric motor 121 connected therewith through two pulleys 122 and 123 and a belt 124. Adjacent the pulley 123 the axis of the shaft 120 is pivotal about the centre of a swivel bearing 125. Adjacent the roller 119 this shaft is journalled in a second bearing 126 carried by the end of an arm 127 which is pivotal about a horizontal longitudinally extending axis 128. The bearing 126 and in consequence the shaft 120 are urged downwardly by a spring 129 so that the rotative driving roller 119 is urged against the roller 117. The bearing 126 and the shaft 120 are raisable in opposition to the action of this spring by a pedal 130. The latter is keyed to a sprindle 131 connected to a crank pin 132 which engages a rocker 133 pivotal about a pin 134. This rocker 133 is connected to the bearing 126 by a rod 135. The rocker 133 may be pivoted by another means which will be described hereinafter.

The lath guiding device comprises in combination: two rollers 136, which are freely rotative about their vertical axes and two parallel blades 137 and 137^a, which are pivotal about two vertical axes 138. The blade 137^a is longer than the blade 137 and carries at its end a side support roller 139. The assemblage comprising the blades 137 and 137^a and the roller 139 may be pivoted about the axes 138 by means of a rod 140 which is urged in the direction of arrow f^{10} by a spring 141. This rod may be moved in the opposite direction, since it is connected, by a crank 142 pivoted to the stand A at 143 (Fig. 5), to the core 144 of an electromagnet 145 which constitutes an auxiliary control device.

The feed circuit of this electromagnet 145 is controlled by a switch I^2 (Fig. 11) which is ordinarily held open by a spring 146. This switch is closed when its movable unit is displaced in the direction of arrow f^{11} by a block member 147 secured to one of the links of a chain 148, after the required number *n* of laths in a panel has been obtained. This chain is driven in synchronism either by the movement of the panel in course of production or, as illustrated, by the thrust means C, and totalizes by the extent of its displacement the number of strokes of the thrust means, which represents the sum of the lath

widths or the number of rows of laths introduced in the passageway B, each row or sum of rows being represented by *x* number of links in this chain. If the chain is connected with the thrust means C, it is passed round a drive sprocket 149 which is connected to the shaft 80 through a reducing gear 149^a and a chain 149^b (Fig. 5) engaged with sprockets 149^c and 149^d. The chain 148 is furthermore passed round a tension pulley or sprocket 150 whose spindle 151 extends through openings 152 provided in a support 153. The length of the chain 148 may be of any length and may have a single block 147 and *nx* chain links. Alternatively, if each panel must have *n* rows the chain may have several equi-spaced blocks situated *nx* links apart. If panels are desired having differing numbers of rows, the distances between the blocks differ.

As will be understood, so long as a block 147 is not in contact with the movable member 146^a of the switch I^2, the electromagnet 145 is not energized and, under the action of the spring 141, the guides 137 and 137^a and the roller 139 are held in the positions shown in full line (Fig. 10). When the electromagnet 145 is energized, these members are shifted, in opposition to the action of the spring 141, to the positions shown in dotted line (exaggerated in the drawing for the sake of clarity).

In the position shown in full line, the moveable guide device is so arranged that the roller 13 holds the horizontal leading edge of the laths being fed in the direction of arrow f^{13} (Fig. 10) against a gluing roller 154 whose vertical spindle 155 is journalled in a bearing 156 secured to the beam 38 (Fig. 5).

When the guide device is in the position shown in dotted line (Fig. 10, the lath, such as *lq*, is turned to the right (Fig. 10) and no longer enters into contact with the gluing roller 154.

The peripheral surface of the gluing roller 154, which is preferably slightly crowned, receives glue from an arcuate opening 157 of a glue supply conduit 158 connected to the lower end of a glue reservoir 159. In a preferred arrangement, the unit comprising the conduit 158 and the reservoir 159 is adjustable with respect to the upright 19 by means of a screw 160 (Fig. 5) so that clearance between the gluing roller 154 and the opening 157 may be regulated. Thus the thickness of the coating of glue applied on this roller and that applied by the latter on the adjacent leading edges of the laths may be readily controlled.

The feed device E is completed by a rotative, pivotal and oscillable saw 161 situated immediately adjacent the end of the feed chamber 43, substantially in alignment with th longitudinally extending edge of the passageway B which is on the left of the machine when the latter is viewed from its input end.

When the feed chamber 43 has recieved a row of closely packed laths without any gap between the abutting ends of the latter, this row being formed, if need be, of a single lath the lath that extends beyond the required length of the row in the direction of the feed device is cut off by this saw 161. The latter is keyed to a shaft 162 journalled in a bearing 163 which is carried by a bar 164 extending in a direcion parallel to the longitudinal axis of the machine. This bar is connected to the frame by a universal connecting means which allows it to pivot about horizontal and vertical axes. In the illustrated example this bar is pivotally mounted by a horizontal journal 165 on a fork 166 which is, in turn, pivotally mounted on a vertical pin 167 secured to the stand A. At its end remote from the saw 161, the bar 164 carries two rollers 168 and 169 (Figs. 4 to 7) which are adapted to roll along the periphery and the lateral face, respectively, of a cam 170 keyed to the shaft 80. The rollers are held in contact with this cam by a spring 171 hooked to the end of the bar 164.

The cam 170 includes on its periphery a recess 172 and on its lateral face another recess 173 (Figs. 6 and 7). The first recess 172 is so arranged that the roller 168 is engaged therein when the shaft 80 is stopped, the thrust means C being in the extreme position of its travel in the direction opposite to that of arrow f^1. In this position the roller end of the bar 164 is lowered and the saw 161 is raised in such manner that the lowermost point of this saw is situated on a level higher than the upper face of the laths in the feed chamber 43. The saw is therefore shifted away from the laths and is inoperative. As soon as the roller 168 moves out of the recess 172 up to the cam rise *hi* (Fig. 6), the saw 161 is progressively and rapidly lowered and cuts through the laths.

The second recess 173 is also arranged in such manner that the roller 169 is engaged therein when the shaft 80 stops but this recess is extended circumferentially round this cam up to the point *j*, so that during the descent of the saw the roller 169 remains in the same position and does not shift the bar 164. After a rotation of the cam through a certain angle from the point *j* to the point *k*, the roller 169 is gradually shifted towards the longitudinal axis XX of the machine

and this causes the saw to be displaced away from the axis.

Further, at a point adjacent the bearing 163, the bar 164 is connected by a rod 174 to the rocker 133 in such manner that when the latter raises the drive roller 119 the saw 161 descends.

The saw is rotated by an electric motor 175 through a belt 176.

OPERATION OF THE MACHINE.

There will be described the cycle of operations for producing the panel Q which follows on the almost completed panel P. The machine will be assumed to be in the position in which the last row *np* of the panel P has just been introduced in the feed chamber 43 at n^1p (Fig. 10), the thrust means C being in its extreme rearward position relative to the laths.

When the row n^1p is filled with laths, this row is pushed by the following laths which are disposed at *lq* and are fed forward by the roller 119 in the direction of the arrow f^3. Hence the row of laths is pushed against the abutment 68 and energetically pivots the lever 65 which applies sufficient force to the lever 72 to overcome the inertia of the weight 74. This lever 72 then closes the switch I^1 which causes the clutch to engage the shaft 80 for one rotation. At the beginning this rotation, during which the shaft 80 rotates through the angle *m* (Fig. 6), the cam 170 is operative. The roller 168 rises up the cam rise *hi* and this causes the saw to descend and separate the row of laths being fed into two sections n^1p and *lq*. During this first part of the rotation of the shaft 80 the rearward dead centre position of the eccentrics is passed through and the thrust means C starts its forward travel in the direction of arrow f^1. The gap *p* (Fig. 7) existing between the introduced row n^1p and the leading edge 61 of the thrust means is first closed and thereafter the latter pushes this row into contact with the preceding row which is held by the presser plates 40 after having closed the gap p^1 which existed between the rows after the row n^1p had been fed in the feed chamber 43. Each fed-in row n^1p is held in position under a slight axial pressure between the abutment roller 68 and the saw 161.

Simultaneously with this action of the thrust means C the roller 169 rolls round the cam rise *jk* and displaces the saw 161 (which is still in its lowered operative position) in the direction of arrow f^4 (Fig. 10). The saw is thus shifted away from the row n^1p and in so moving very slightly pushes back the lath *lq*. This is made possible by the fact that in the course of the descent of the saw the rod 174 caused the rocker 133 to pivot and raise the bearing 126 and the driving roller 119 so that the laths were no longer fed towards the feed chamber 43.

When the foregoing has been accomplished, the thrust means C bears more firmly against the row n^1p and pushes it in the direction of the output end of the passageway B, thereby causing this row of laths to engage under the presser plates 40, which prevent it from returning, and take up the position of the preceding row which is moved forward under the retaining plates 35.

The almost instantaneous thrust is considerable, for it corresponds to a part of the considerable energy stored in the flywheel 85 while it is rotating freely. This thrust is transmitted to the now completed panel P through the row n^1p, which has just taken up its position at *np* against this panel. The latter in turn transmits the thrust to the preceding panel. This applied pressure is in fact distributed over all the rows of laths of the various panels located in the passageway B. This latter, on account of its narrowed entrance and exit, exerts a retaining force on the first rows on the input side thereof and on the last rows on the output side. The other rows are substantially free to move although they are not completely free in the direction of the thickness of the panels so as not to impair the perfect flatness of the latter. Owing to the perfect distribution of the thrust over all the rows, the gluing obtained between these rows is intimate and evenly distributed.

It will be observed that if the glue is thermo-setting the heating chambers forming part of the output side of the passageway B causes this glue to harden so that the panels issuing from the passageway are rigid and there is no danger of their laths separating.

While the last row *np* of the panel P is being fed forward by the thrust means C, one of the blocks 147 of the chain 148 encounters the member 146^a of the switch I^2 and the latter is closed. Thus, the electromagnet 145 is energized and, in pulling back the rod 140, it causes the guide device 137, 137^a to assume the position shown in dotted line in Fig. 10 and the lath *lq* is shifted away from the gluing roller 154.

Soon after this has occured, at the end of the forward travel of the thrust means C, the stop 103 encounters the crank 102 which is integral with the clutch lever 94. The latter is pivoted towards the clutch and the shaft 80 is disengaged at the end of its rotation through 560°, at which point the thrust means C has returned to its extreme rearward position.

As soon as the clutch is disengaged, the friction members 112 of the eccentric devices brake the shaft 80 by bearing against the straps 106 and the rods 107 connected to the thrust means C, so that the shaft 80 is stopped instantaneously.

A little before the end of the rotation of the shaft 80, the cam 170 raises the saw 161 and moves it in the direction of arrow f^{13}, thereby returning it to its initial position. This automatically returns the drive roller 119 against the lath *lq*.

A new cycle of operations or stroke of the machine is started by feeding the feed chamber 43 with a lath or laths *lq* until this chamber is completely filled. The shaft 80 remains disengaged and, in consequence, the guide device 137, 137ª, and 139 remains in the position shown in dotted line (Fig. 10) so that the lath or laths *lq* enter the feed chamber 43 without touching the gluing roller 154. Thus, the first row *lq* of the panel P will not include glue on its edge except at 14 (Figs. 2 and 10) along a very short length *rs* which had already passed by this roller in the previous cycle before the guides 137, 137ª and 139 were shifted to their position shown in dotted line by the electromagnet 145.

When the row of laths *lq* has filled the feed chamber 43, it strikes the abutment 68 and thereby closes the switch I^1 and the shaft 80 is once more rotated by the flywheel 85. The above-described sequence of operations is repeated, at the start of which the block 147 leaves the roller 146ª of the switch I^2 and cuts off the current to the electromagnet 145 so that, under the action of the spring 141, the rod 140 returns the guide device 137, 137ª and 139 to its normal position for applying glue to the laths.

The sequence of operations continues normally and the row *lq* is applied against the row *np* of the preceding panel P but adheres to the latter only along the short length *rs*. The following rows of laths have glue applied thereon along their entire length until the last row *ng* of the panel Q is fed to the feed chamber 43 when the presently described cycle is finished.

It should be understood that in the course of operation the machine may be stopped by raising the rods 107 with the aid of levers 106ª carried by the eccentric straps 106. When the machine has been stopped, any required adjustments may be carried out, for example, the position of the abutment 68 may be modified in order to change the dimension l^1 of the panels, or the boss or bosses 147 may be shifted in order to alter the number of rows of laths per panel.

Although a specific embodiment of the invention has been described hereinbefore it is to be understood that many changes and modifications may be made to subordinate details to suit different requirements.

What we claim is:—

1. Machine for producing panels formed of a juxtaposition of laths or other squared elements having a constant cross-section, this machine being of the type including a receiving and discharging passageway, a lateral feed device for introducing one by one adjacent the entrance of said passageway successive rows of squared elements disposed transversely of this passageway, this device including gluing means for continuously gluing these elements, thrust means for moving each row introduced and the whole of the work in the longitudinal direction of the passageway and driving means including a clutch mechanism, this machine being characterized in that it comprises in combination with the aforementioned devices: a first regulating device for determining the length of the rows; control means for said clutch mechanism associated with this first regulating device for engaging the driving means for the thrust means when one row has been obtained without any space between the squared elements disposed end to end, this row being if need be formed of a single squared element; a second regulating device and shifting means provided on the feed device and controlled by the second regulating device for separating the first row of each panel to be produced from the gluing means.

2. Machine as claimed in Claim 1, wherein said first regulating device comprises an abutment member mounted to pivot in opposition to yieldable return means on a slide adjustable tranversely of the machine on the thrust means, and a stop for limiting the pivotal movement of said abutment member.

3. Machine as claimed in Claim 2, wherein the driving means comprises a rotative shaft and the clutch mechanism is engaged by an electromagnetic device whose feed circuit includes an electric switch whose movable contact is controlled by a pivotal lever which is urged into its position corresponding to an open switch by yieldable means and is in unidirectional contact with said pivotal abutment member, the arrangement being such that the amplitude of the pivotal movement of said lever is sufficient for closing said switch only if the pivotal abutment member receives, through the medium of a complete row of squared elements, the thrust exerted on this row by the feed device.

4. Machine as claimed in Claim 3,

wherein the clutch mechanism comprises an engaging member urged towards its operative clutch engaging position by yieldable means and towards its inoperative clutch disengaging position by a clutch disengaging member which is held in the position of clutch disengagement by locking means in opposition to the action of yieldable means, said electromagnetic device controlled by the first regulating device is so adapted and arranged for disengaging said locking means, the thrust means being adapted and arranged for reengaging said locking means and thus causing clutch disengagement at the end of the forward thrust-exerting travel of the thrust means.

5. Machine as claimed in Claim 1, wherein said second regulating device combined with the shifting means for shifting the first row of elements away from the gluing means comprises totalizing means which is driven in synchronism with said driving means in such manner that it is moved a constant amount each time one row of squared elements is introduced in the passageway, this totalizing means including at least one projection adjustable in position thereon and adapted to actuate said shifting means provided on the feed device each time n rows are introduced, n being determined by adjusting the position of said projection.

6. Machine as claimed in Claim 5, wherein said totalizing means comprises a chain or other endless means connected by a slip-free transmission to said driving means, said projection being formed by a block attached to this chain.

7. Machine as claimed in Claim 5 or 6, wherein said totalizing means is combined with an auxiliary control device adapted to actuate said shifting means, the projection of said totalizing means being so adapted and arranged as to set into operation this auxiliary control device.

8. Machine as claimed in Claim 7, wherein said auxiliary control device comprises an electromagnet in the circuit of which is disposed a switch controlled by said projection of the totalizing means.

9. Machine as claimed in any of the Claims 1 and 5—8, wherein the gluing means is fixed in position and the shifting means comprises a movable guide for guiding the squared elements while they are being fed by the lateral feed device.

10. Machine as claimed in Claim 9, wherein said movable guide comprises the combination of two parallel pivotal blades and a roller carried by one of these blades, the latter being connected to a control member subject to the opposing actions of yieldable return means and said auxiliary control device.

11. Machine as claimed in Claim 10, wherein the gluing means comprises a rotative roller disposed in front of said roller of the movable guide.

12. Machine as claimed in Claim 11, wherein said gluing roller is fed with glue from a glue reservoir by a conduit provided with an arcuate opening concentric with said gluing roller, this reservoir and this conduit being adjustable in position so as to permit the thickness of the glue applied on said gluing roller to be regulated.

13. Machine as claimed in any of the preceding claims, wherein the lateral feed device comprises in combination: a drive device for driving the squared elements and capable of being rendered inoperative, and a saw capable of being moved away out of action and disposed at the entance of said feed chamber, a pivotally-mounted support of this saw being connected to said drive device in such manner that the latter is rendered inoperative when the saw enter the squared element in the course of being fed.

14. Machine as claimed in Claim 13, wherein the saw is journalled in a bearing carried by a support member capable of pivoting on the stand of the machine about two orthogonal axes, one horizontal and the other vertical, under the action of a cam forming part of said drive means, whereby this saw has not only an alternating up and down movement for sawing the squared element but a transverse movement relative to the passageway so that after the sawing operation this saw may be shifted away from the panel in the course of production.

15. Machine as claimed in Claim 14, wherein the drive device for the squared elements comprises two rollers one of which is rotative continuously while the other is so connected to the support member of the saw as to be shifted away from the squared element when this saw accomplishes its active sawing travel and its transverse movement.

16. Machine as claimed in any of the preceding claims, wherein the thrust means comprises a member which is transversely disposed with respect to the passageway, is mounted on the stand of the machine by means of an articulated parallelogram assemblage and is connected to the driving means by unidirectional coupling means which are readily uncoupled.

17. Machine as claimed in Claims 3 and 16, wherein the thrust means is connected to the rotative shaft of the driving means by connecting rods which carry adjacent the thrust means at least one roller engaged in an open hook-

shaped support integral with said thrust-means.

18. Machine as claimed in Claim 17, wherin said connecting rods are connected to said shaft by eccentrics having a plate and eccentric strap which are combined with braking means.

19. Machine as claimed in Claim 18, wherein said braking means comprises two discs which are applied, with the interposition of fricton members against the lateral faces of the plate and eccentric strap by yieldable means.

20. Machine as claimed in any of the preceding claims, wherein the receiving and discharging passageway is so adapted and arranged as to accumulate and distribute over all the rows of squared elements contained therein the pressure exerted by the thrust means for a short period on each row introduced in this passageway.

21. Machine as claimed in Claim 20, wherein the passageway comprises the space provided between two superposed walls which are so adapted and arranged that they form a restricted entrance and exit which exert retaining friction on the rows of squared elements, these elements being however free to move without friction in the remaining part of said passageway, which further comprises auxiliary retaining means immediately adjacent said feed chamber provided near the entrance of said passageway.

22. Machine as claimed in Claim 21, wherein the lower wall of the passageway is in the form of a base plate which rests at its end adjacent the exit of the passageway on a fixed support and at its other end on adjustable jacks, the upper wall of this passageway comprising a section which is disposed adjacent the entrance thereof and yieldably bears on the stand of the machine and a second section which is disposed adjacent the exit of the passageway and is pivoted to said first section at one end and adjustably supported on the stand of the machine at its end remote from said first section.

23. Machine for producing panels formed of the juxtaposition of laths or other squared elements, substantially as herein described with reference to the accompanying drawings.

24. Panel obtained by means of the machine claimed in any of the preceding claims, this panel being formed of a number of rows of squared elements, each row comprising a single or several squared elements disposed end to end and abutting, the number of elements depending on their lengths and these elements being presented to the machine in haphazard manner, the different rows being glued together along the entire length of their lateral edges, and the leading edge of the first row of the panel as it issues from the machine comprising along a short distance from one of its ends traces or glue which connects this panel to the preceding panel.

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Fig. 1

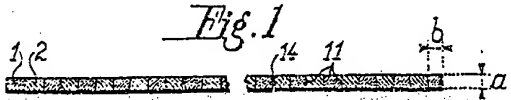


Fig. 2

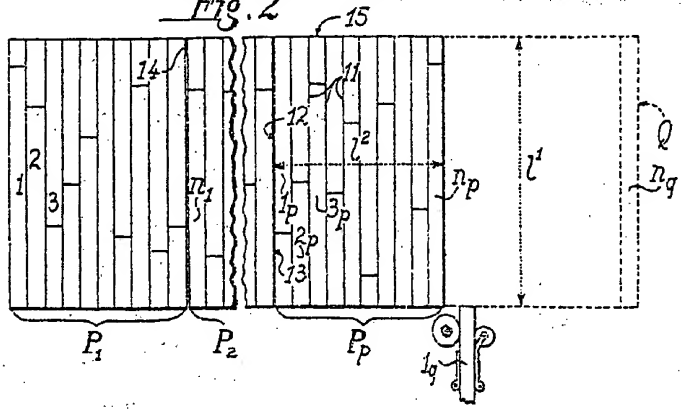
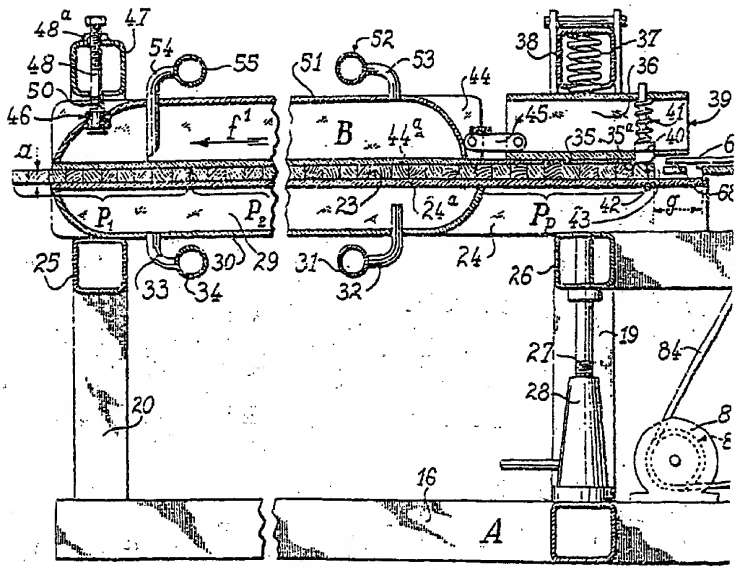


Fig. 3



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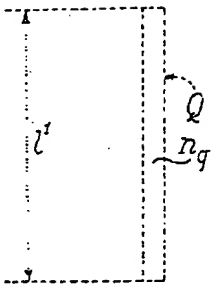

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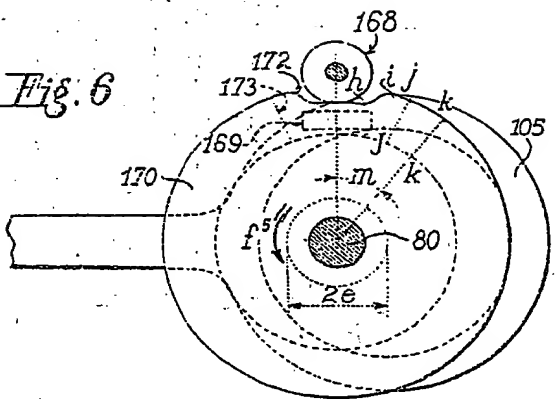

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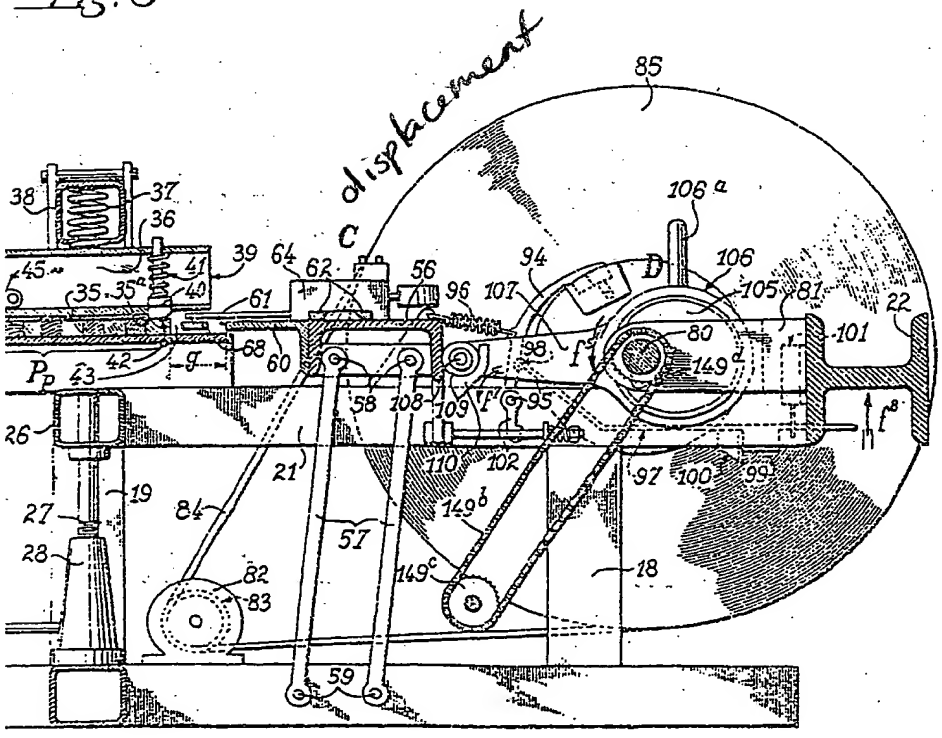

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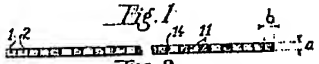
SHEET 1

Fig. 1



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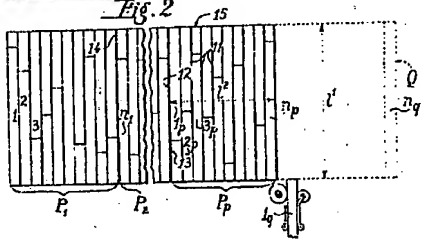

Fig. 6

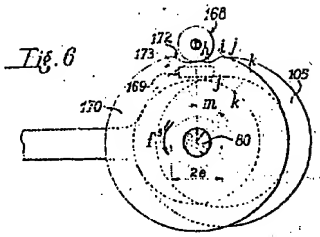

Fig. 3

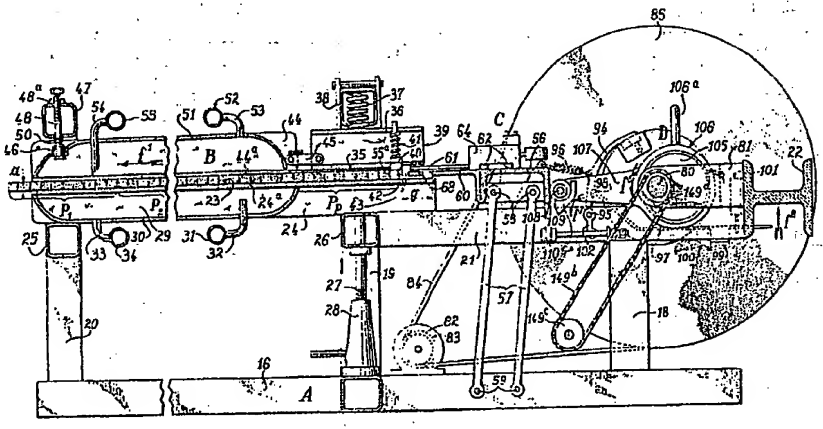

Fig. 4

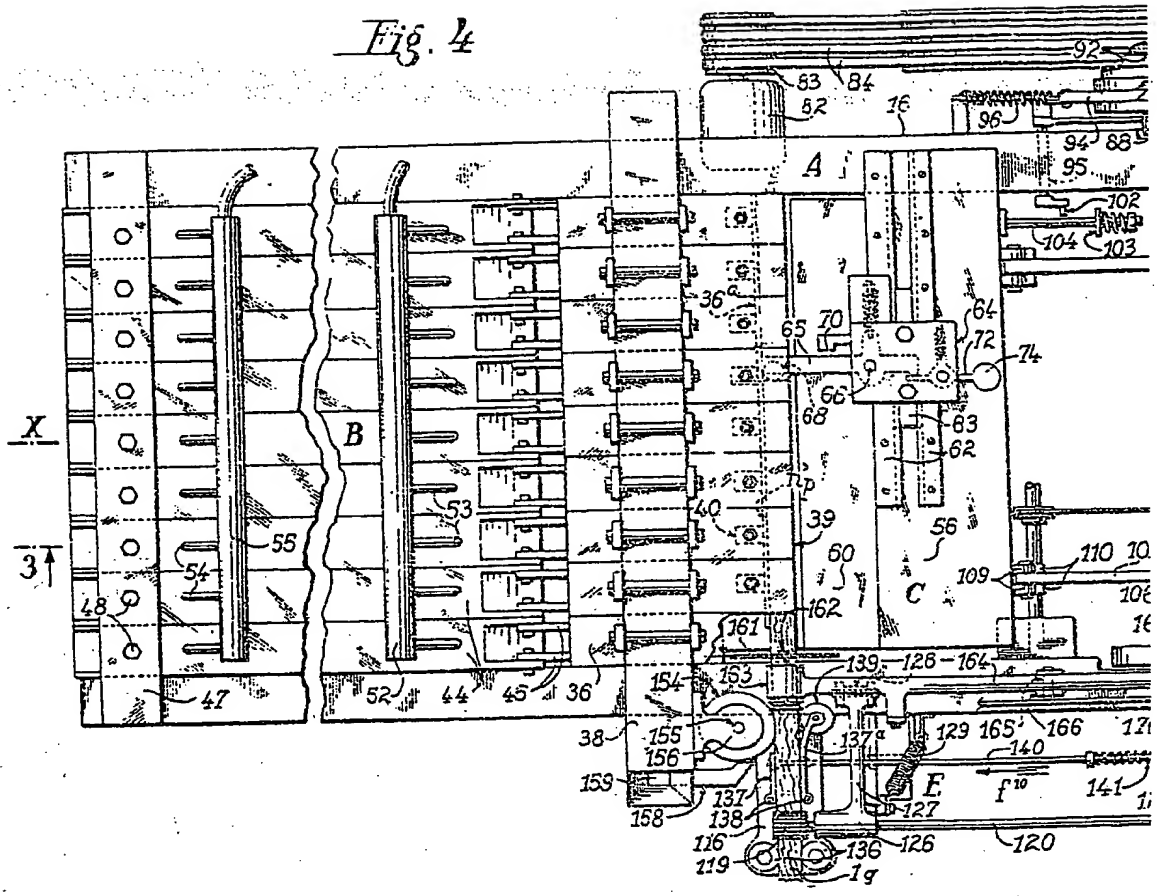
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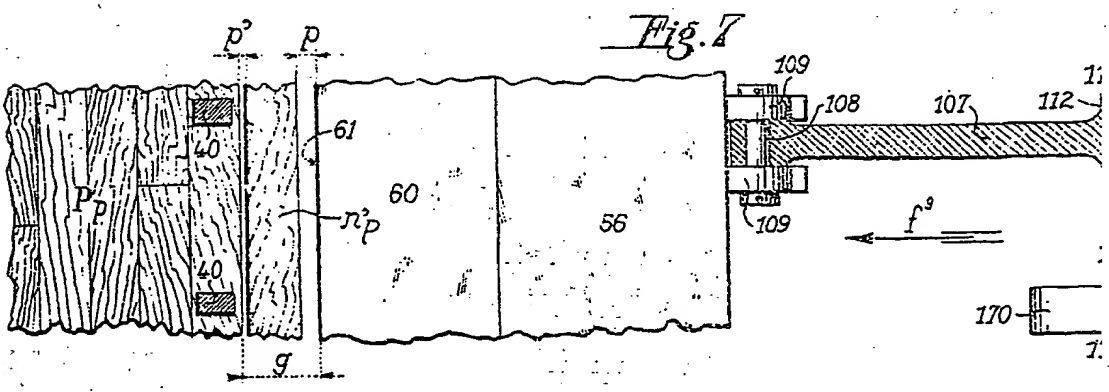
Fig. 7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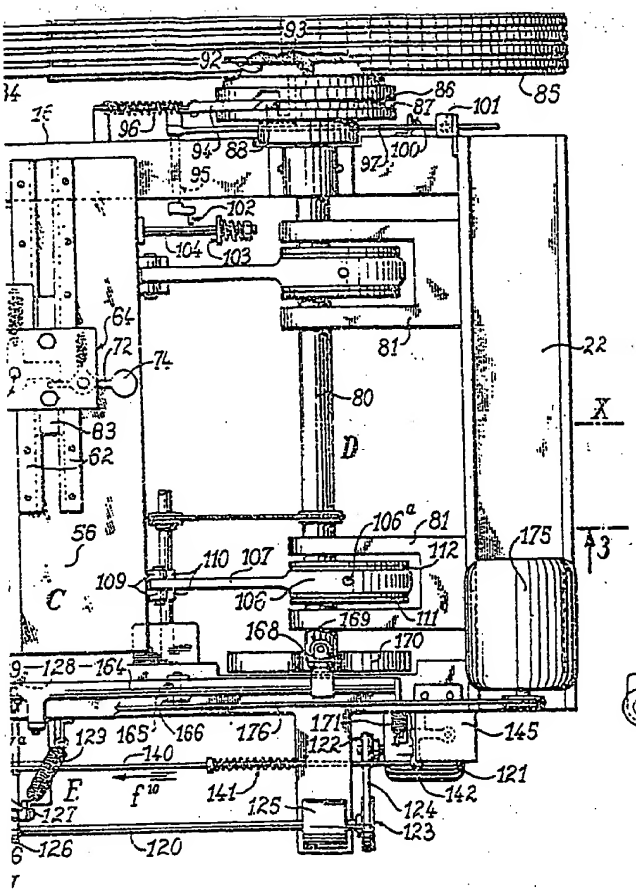

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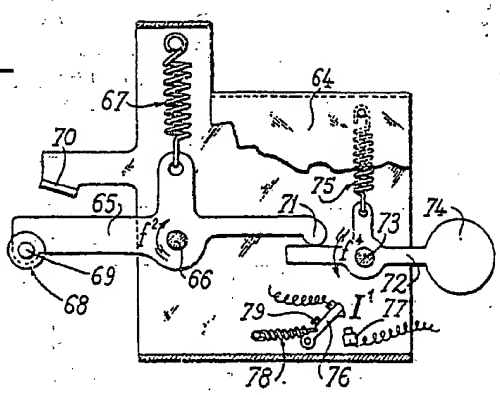


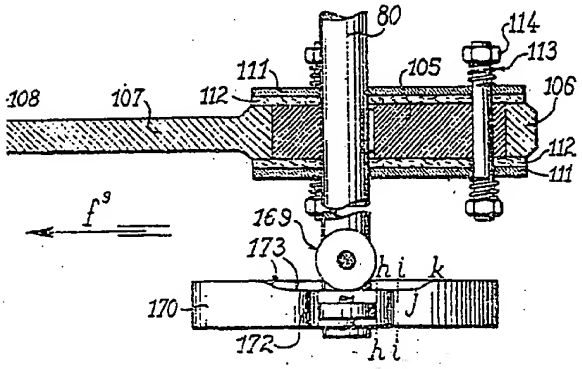
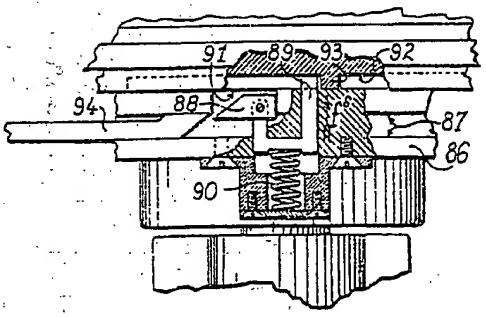


Fig. 9



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SHEET 2

Fig. 4

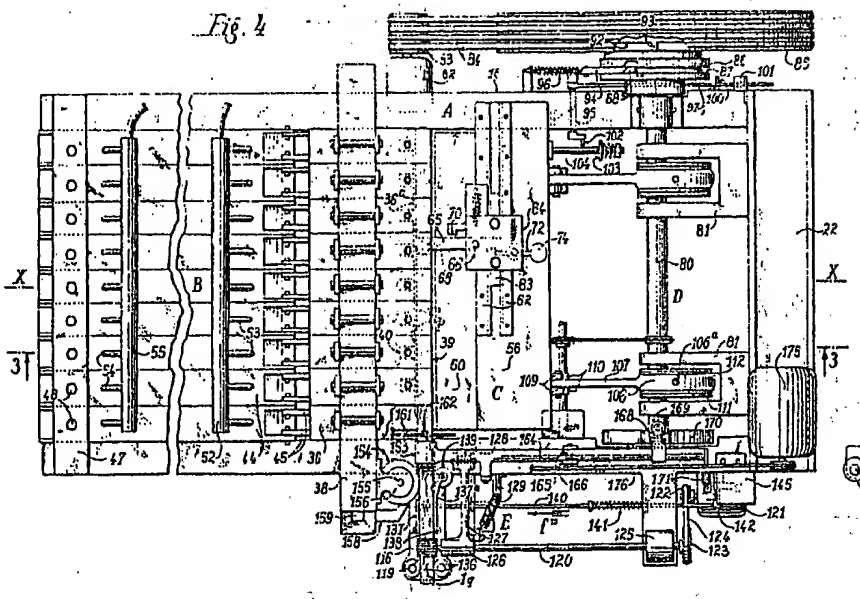


Fig. 8

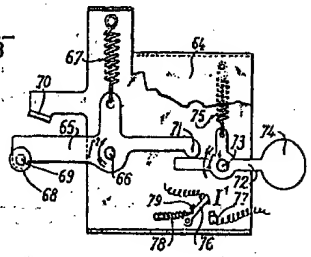
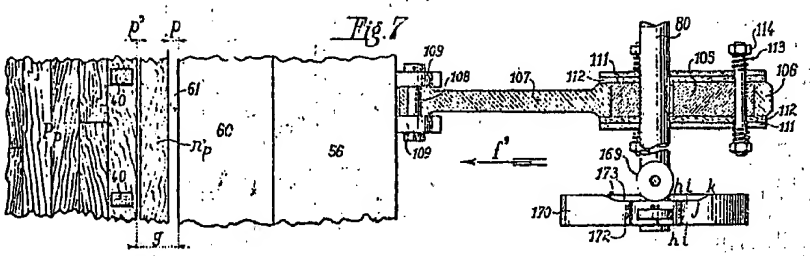


Fig. 7



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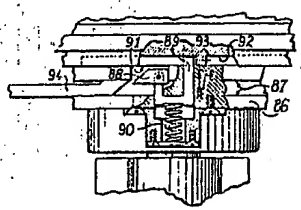

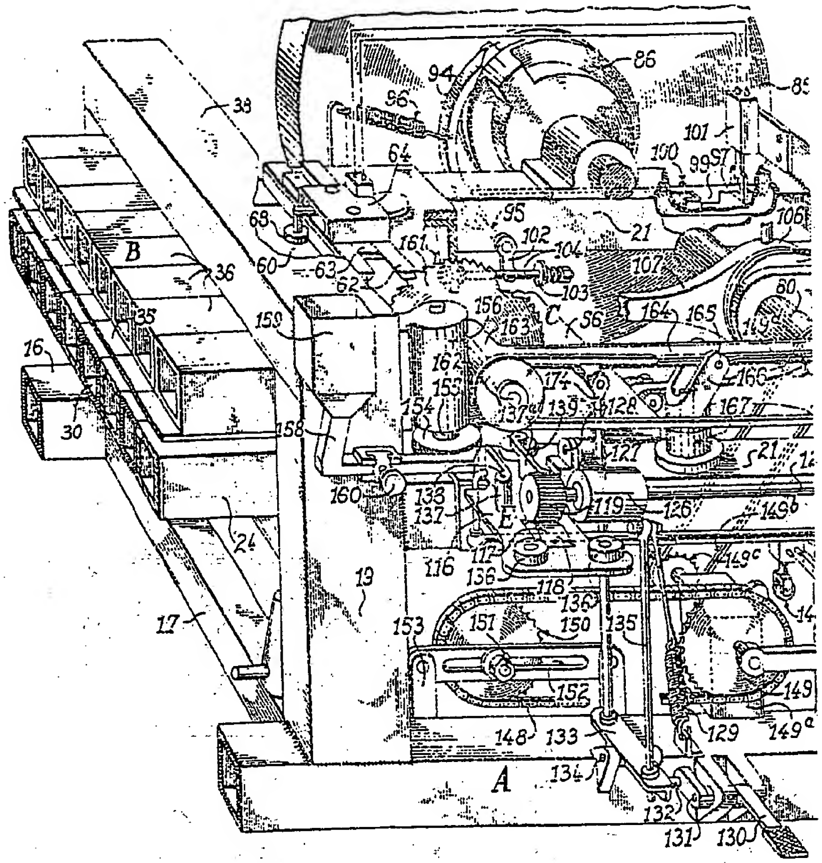
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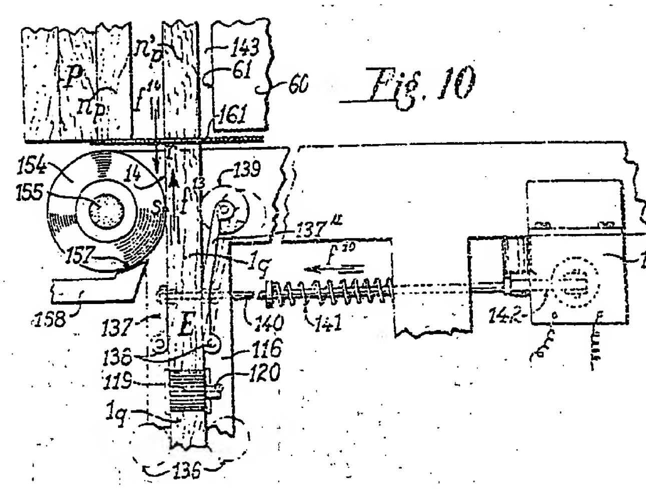
Fig. 10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3 SHEETS

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SHEET 3

Fig. 5

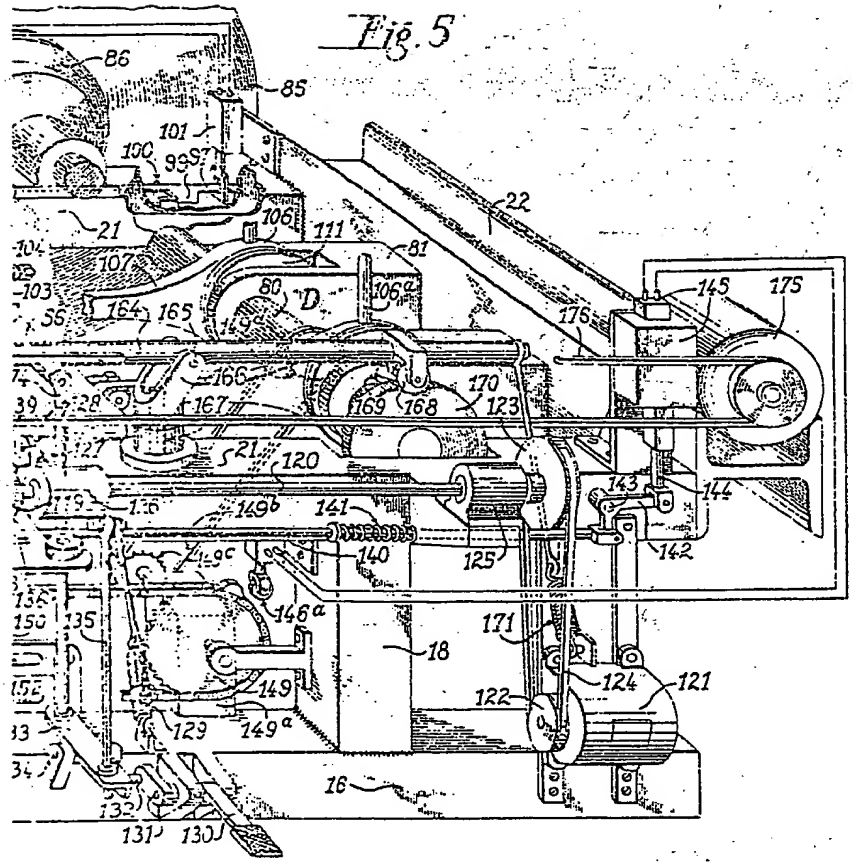
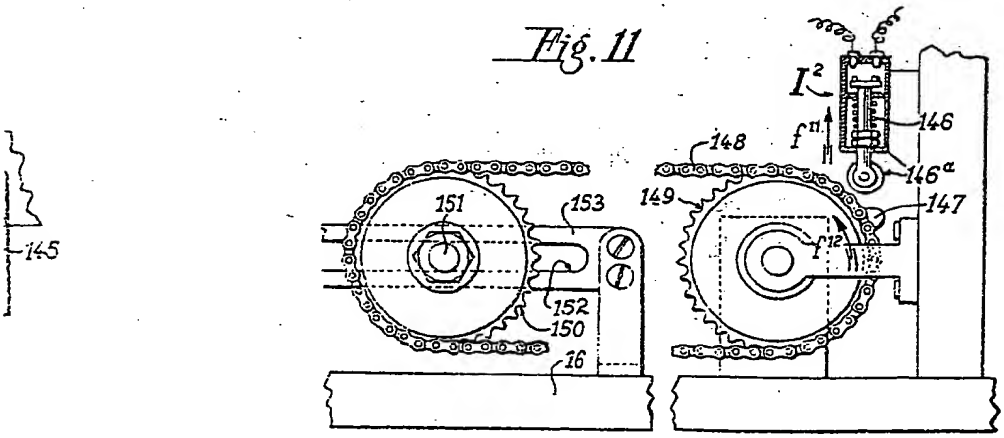


Fig. 11



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SHEET 3

Fig. 5

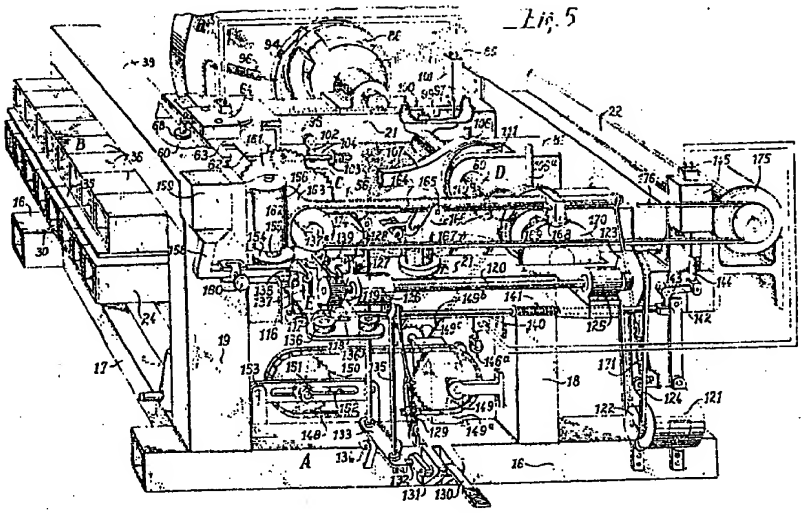

Fig. 10

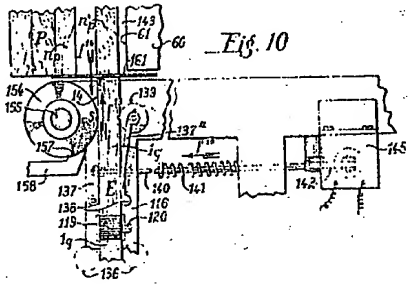

Fig. 11